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ABSTRACT

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Single Parents, Working Mothers and the Educational Achievement of Secondary School Age Children*

David E. Myers
Ann Milne
Fran Ellman

Decision Resources
Washington, D.C.

Alan Ginsburg

Department of Education

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

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SINGLE PARENTS, WORKING MOTHERS AND THE EDUCATIONAL ACHIEVEMENT OF SECONDARY SCHOOL AGE CHILDREN

Abstract

This paper presents a replication of previous research which estimated a structural equation model relating elementary school age student's achievement to the number of parents and maternal work. The research presented here focuses on secondary school age students, and provides partial support for previous findings in which elementary school age students were analyzed. The effects of maternal work were found to be similar in both the elementary and secondary school samples (e.g., negative total effects on student's achievement in two parent families and positive total effects in one-parent, black families), but the total effect of number of parents on student's achievement for secondary school age students tended to be negligable.

Increasing numbers of children, whether by divorce, death, desertion, or separation, are being raised in homes with only one parent. At the same time, more women are leaving traditional motherhood for careers, or to supplement family income.1/ Although much research has been undertaken to determine the effects of single parents and maternal work on student achievement, there are major disagreements in the findings. Numerous studies of single-parent families support the supposition that prolonged father absence has significant negative effects on a student's verbal and quantitative skills (Sciara, 1975; Stetler, 1959; Jaffe, 1965; Sutton-Smith, Rosenberg, and Landy, 1968; Ferri, 1976). Other studies of single-parent households, however, suggest that father-absence has in some cases positive, significant effects on student achievement (Oshman, 1975; Vroegh, 1972, 1973; Carlsmith, 1964), while some studies report that the presence or absence of a father results in no significant differences between samples (Kitano, 1963; Wilson, 1967; Atkinson and Ogston, 1974; Birnbaum, 1966).

1/ Statistics from the Bureau of the Census show that in 1970, 11.2 percent of those persons under age 18 were living in single parent homes and that by 1980 almost 19 percent were living in single parent homes. In addition, in 1970 42 percent of those mothers with children under age 18 were in the labor force and that by 1980, about 57 percent were in the labor force.

The results are sufficiently inconsistent to have led the authors of major reviews of the literature to form different conclusions, depending to some extent on the studies included in each review. Herzog and Sudia (1973:214), examining studies published before 1969, generally argue for a finding of "no difference" in school achievement between father-present and father-absent children. In a review of the more recent research literature on the effects of father absence, Shinn (1978:321) concludes that "rearing in father-absent families ... is often associated with poor performance on cognitive tests. Anxiety and financial hardship in father-absent families may also contribute to the observed effects." Authors of the most recent review (Hetherington, Camara, and Featherman, 1981) find both negative and positive effects, but suggest that negative effects of father-absence diminish or disappear when other critical variables, particularly socioeconomic status, are controlled.

Research on maternal work status has also failed to produce consistent results. In a recent review of the literature, Heyns (1982b) concludes that, in terms of achievement, the children of working mothers generally differ very little from the children of nonworking mothers, with a few exceptions, e.g., studies of maternal work status in poor and black households have found that

working mothers have a positive effect on student achievement (Woods, 1972; Heyns, 1978). Mercy and Steelman (1982), however, obtain results which do not coincide with Heyns' general conclusion. In a study on the effects of home background variables on student outcomes, they showed that maternal work status has a negative direct effect on I.Q.

Much of the inconsistency in the findings may result from the fact that each of the studies has differentially taken into account other background variables that may be correlated with either single-parent families or maternal work status which, in turn, may be even more important correlates of children's achievement. These background variables include parental influences such as educational expectations for their children, and family inputs such as time and financial resources.

It is noteworthy that Herzog and Sudia (1973:157) concluded "no difference" in school achievement between father-present and father-absent children while also conceding that "no study reviewed here has been entirely successful in controlling for SES." Similarly, while Heyns (1982b:254-255) concluded that children of working mothers generally differ very little from the children of nonworking mothers, she also points out four methodological problems in current research on maternal work status:

1. Classification of working, as well as of not working, needs more conceptual and theoretical refinement...

2. Cross-sectional studies do not capture the dynamics of change, nor can they resolve the issue of causality.

3. Critical links between maternal employment and school achievement have not been systematically explored.

4. Conceptual tools do not yet exist for understanding the structural change in the nature of work and family life...

A recent study by Milne, Myers, Ellman, and Ginsburg (1983) attempted to remedy some of these methodological concerns by separating a number of home background variables to determine the total direct and indirect effects on achievement.

Using secondary analyses of a large nationally representative database on elementary school students, Milne et al., (1983) found that the number of parents in a household did have a statistically significant total effect on achievement, but not a statistically significant direct effect. Their results suggested that a large proportion of the total effect was mediated by subsequent home background variables, particularly income. Thus, they concluded that residence in a single-parent family is associated with low achievement and the predominant effect results from the lower income of the single parent and not the mere absence of a parent. They also found that the total effect on achievement of a working mother in a two-parent family is negative, significantly so for whites.

While Milne et al., (1983) were able to show, rather conclusively, that there are differences in achievement for elementary school age students from single- and dual-headed households, as well as a negative relationship between maternal work and student achievement. However, it is not necessarily the case that their results may be generalized to all student populations. In order to estimate the generalizability of the results obtained by Milne et al., (1983) we undertook a replication analysis using secondary school age students, but duplicating as many other variables used in that study as possible. The results of this study are reported here. Apart from the purposive selection of a different age group, the replication is not exact for two reasons: (1) several variables are measured differently, and (2) two of the variables used by Milne et al., (1983) are not available for this analysis.

While the intent of the study reported here was to replicate the results obtained by Milne et al., (1983) it was also hypothesized that secondary school age students may respond differently to some of the variables in the model than do elementary school age children. The findings of major interest in the Milne et al., (1983) study -- that single parents and working mothers in dual-headed households have a negative total effect on student's achievement -- may not hold true for secondary

school age children. During the elementary school years, student success may be closely associated with the home environment. By high school, however, student achievement may not be as dependent on home background variables, but instead on peer and other influences from outside the home. Alternatively, these or other background variables may have cumulative effects which are likely to affect students by high school age. For example, the effect of maternal work status may differ depending on whether a mother worked full-time or part-time over a long period of time. Another variable which may have a cumulative effect is time spent viewing television. While Milne et al., (1983) found no effect of this variable on achievement, others (e.g., Hornik, 1978) suggest the effect may be long-term and may not appear until students are older. Not only may these effects be cumulative, but they have differential effects conditional by the child's age.

An additional variable which may have differential effects on achievement for elementary and secondary school age students is gender. Milne et al., (1983) observed that female students in elementary schools had higher achievement than male students. However, recent research has shown that by high school, male students out-perform female students, particularly in mathematics. For a review of the literature, see Armstrong (1979).

Finally, differences in achievement between elementary and high school students, and in the variables which correlate with achievement, could reflect a greater restriction in variability in achievement in high school students. While students rarely drop out of school prior to high school, they do in high school, leaving a more homogeneous (and presumably higher achieving) population.

Data

The data used for the analyses are from the 1980 High School and Beyond Survey (HSB). The HSB survey is a national longitudinal study of 58,270 high school sophomore and senior students in the United States in 1980. Students for the survey were selected through a two stage sampling design. Schools were first selected with probability proportional to their estimated enrollment; then within each school, 36 sophomore and 36 senior students were randomly selected. Because of the sample design, it is necessary to weight each of the student records used in the analyses. The weights provided with the HSB database sum to national totals, and were used in the analysis.

Note that the data used here are not generally retrospective, and as such do not allow many inferences that could be drawn from such data. The greatest flaw

in this respect is the lack of information concerning the length of absence of the missing parent. One advantage to the available data, however, is the wealth of information on maternal work status which allowed us to develop cumulative measures of maternal work status across the child's lifespan. Data on whether a student's mother worked full-time, part-time, or not at all before a student was enrolled in an elementary school, during elementary school, and during high school were obtained. From this information we formed three dummy variables. The first dummy variable indicates whether a mother worked full-time during each of the three time periods. The second dummy variable shows if a mother worked less than full-time during the three periods, but did work to some extent. Finally, the third dummy variable indicates if a mother reported not working during the three periods of time. A complete description of each of the variables used in the analysis is provided in Appendix A.

Data for the analyses reported here were obtained from both the student and parent surveys. Since only a relatively small sample of parents was selected, the sample size is reduced to about 6,000 observations. Further, we have selected only student's with complete data, a race of either black or white, and living with only their true mother, or true mother and father and

therefore, have further reduced the sample size to about 2,800. This procedure was followed because we did not want to include dual-parent households in which a marital dissolution has taken place and therefore, confound the effects of number of parents on student's achievement.

While most of the variables used in the analyses reported here could have been obtained from the student data, we have opted to use the parent responses whenever possible, particularly in the case of family income, mother's educational attainment, and maternal work. Preliminary analyses have demonstrated low reliability for student reports of parental background variables (Rosenthal, Simonsick, Baker, and Ginsburg, 1982). In addition, preliminary analyses suggested that there was not only random measurement error, but that systematic error may be present when student reports of parental characteristics are used. Thus, it was decided that the disadvantage of the smaller sample size was outweighed by the problems incurred by using the student reports of family characteristics.

The outcome measures of achievement used here are two separate measures — reading and math scores on the "common items" administered as part of the High School and Beyond survey.2/ We have not combined the reading and mathematics scores into an overall achievement measure, as

recent studies (e.g., Rosenthal et al., 1982) have demonstrated that home background variables have different effects on the two subject areas.

Conceptual Model

The conceptual model developed for this study -- following the model developed by Milne et al., (1983) -- is based on Eckland's (1971) "standard deprivation model of social class and intelligence," which links parental status attainments, family environments, and children's abilities in obvious ways. One criticism of this model is the omission of parental abilities as antecedents to all variables in the model (Williams, 1976). Williams further notes that comparatively less has been said about the effects of parental abilities on the nature of the family environment, but that the available evidence suggests that the relationship is substantial. Thus, family environment measures are considered to be intervening mechanisms through which the parental ability variables operate to affect children's ability. However, measures of parental ability are not often available in databases containing detailed information on student backgrounds and

2/ The "common items" refer to the questions on the achievement tests which were administered to both the sophomore and senior students. A detailed examination of the achievement tests used in the High School and Beyond Survey may be found in Heyns and Hilton (1982).

abilities. Thus, measures of parental status attainments must be used, as is the case here.

The conceptual model used for this study is shown in Figure 1. As can be seen from the figure, we have not only interposed family environment variables between the parental status attainments and measures of child achievement, but we have also interposed a measure of mother's work status, and a second set of background variables hypothesized to affect child's achievement -- parental inputs and student behaviors. Ideally, this latter set of endogenous variables should include the same parental and child behaviors as the Milne et al., (1983) study which is being replicated here. However, two such variables (number of parent-teacher conferences and the extent to which parents help with children's homework) were not available. Nevertheless, the variables that are included are similarly hypothesized to mediate the family background variables.

FIGURE ONE ABOUT HERE

The exogenous variables are seen as truly antecedent, and include number of parents in the home, as well as mother's educational attainment and student's gender. Race is used as a control variable based on the research literature showing achievement differences for blacks and

whites (e.g., Coleman, Hoffer, and Kilgore, 1966; Jencks, Smith, Arland, Bane, Cohen, Gintis, Heyns, and Michelson, 1972). Student's gender is also included as an exogenous variable based on the literature showing differential achievement between boys and girls (Armstrong, 1979).

Mother's work status is interposed as the first endogenous variable because it is assumed that the exogenous variables (particularly, number of parents in the home and mother's education) influence whether or not a mother chooses to work, and this variable, in turn, affects the first set of endogenous family background variables, such as family income. Mother's working is also expected to influence student achievement differently for black and white students, since studies of maternal employment have consistently found that having a working mother contributes positively to the achievement of black children (Heyns, 1982b; Woods 1972; Heyns 1978; Cherry and Eaton, 1977; Kriesberg, 1967; Milne et al., 1983). Heyns (1982b) summarizes the possible contributing factors to positive effects of maternal employment on black children as (1) greater employability of black mothers than of other family members; (2) greater energy, competence and education among employed than unemployed black mothers; (3) greater number of adults in the household to contribute to child care; and (4) greater support within the black culture for maternal employment. In addition,

it should be noted that these may be greater marginal returns in terms of family income if a black women works rather than a white women.

The endogenous family environment variables include number of siblings and family income, which have been shown to be related to number of parents and maternal employment. (The relationship between maternal work and fertility has been extensively researched; see, for example, Hofferth and Moore, 1979.) In addition to number of siblings and family income, parental educational expectations are also included in this first set of endogenous variables, given its probable relationship to the family background variables.

Both the exogenous variables and the endogenous family environment variables are in turn hypothesized to have direct and indirect effects on how parents choose to expend their resources relative to their children (Leibowitz, 1977; Hill and Stafford, 1973) and the ways in which the children themselves spend time, with or without the impetus and supervision of their parents (Thomas, 1980). These process variables are included as the second set of intervening variables. The only parental input variable available here is number of books available in the home. The number of books is posited to be mediated by the family environment variables, such as family income; thus its placement in the model.

The child input variables include time spent reading, doing homework and watching TV, to determine the effects on achievement of how students balance their time among these activities. Coleman et al., (1982) have shown that there is a trade-off between time spent on homework and time spent watching television and that differences in the level of homework account for a small but consistent part of the differences in achievement between private and public high school students. Studies investigating the relationship between television viewing and achievement, however, have been inconclusive. The rationale behind a negative relationship relies on the notion of displacement. Time spent with television interferes with homework and study time; heavy viewers go to bed late and concentrate less on school work and do not read or follow more "educational" pursuits (Himmelweit, Openheim and Vince, 1958; Schramm, Lyle and Parker, 1961). The rationale behind a positive effect of television stresses its intrinsic educational value and help with schoolwork -- specific shows may encourage new interests in school subjects and television may represent a valuable and stimulating information resource.

All variables are hypothesized to be linked, directly and indirectly, with children's achievement. Parental inputs and child behaviors are assumed to be related directly to achievement (Benson, Medrick, and Buckley,

1980; Leibowitz, 1979). The family environment variables as well as mother's education and work status may not only be mediated through the parental and child behaviors, but also are likely to have direct (unmediated) effects on achievement.

Results

Achievement of Children from Single and Dual-Parent Families, by Race

The means and standard deviations of all variables used in the analysis are presented in Table 1, by race and number of parents in the home.

TABLE ONE ABOUT HERE

For many of the variables, the means are similar within races, yet there are substantial differences across races. White students from both single and dual parent homes score, on the average, seven tenths of a standard deviation higher than their black counterparts in reading, and about nine tenths of a standard deviation higher in math. An examination of family income for the four groups shows that black single-parent households have the lowest family income ($11,770.10) and white dual-parent households are at the top of the scale ($38,213.40). The three dummy variables for maternal work status show that in general, both black mothers from dual- and single-

parent households are more likely to have worked full-time during all three time periods than are white mothers. For part-time work, though, we find that white mothers are more likely to have engaged in this form of work than are black mothers. Finally, we observe that white mothers from dual-parent households have the highest probability of having never worked during the three time periods relative to the other three groups.

Estimates for a Model of Achievement

To analyze the effects of number of parents on reading and mathematics achievement of secondary school age students, we estimate separate recursive models for the four populations of students defined by race and number of parents.3/ As in the Milne et al., (1983) analysis, our major focus is on the decomposition of the total effect of number of parents and maternal work in student's achievement into direct and indirect effects.

Following Milne et al., (1983), we report ordinary least squares estimates. As with any analysis of a structural equation model where ordinary least squares is used, it is assumed that the "independent" variables are measured without error. As noted in the methodological

3/ The procedure of separating the original sample into four distinct groups is supported by analyses not shown here. In these analyses, significant interactions between number of parents, race, and other independent variables (i.e., three-way interactions) on achievement were found.

literature, random measurement errors in the independent variables produce a downward bias in ordinary least squares estimates and therefore, suggest that relationships between variables are not as strong as would be obtained if the independent variables could be purged of error (see, for example, Duncan, 1975; Namboodiri, Carter, and Blalock, 1975).

The discussion of the model estimates is divided into three parts. First, we examine the direct effects of the exogenous and endogenous variables on the intervening variables in the model. Second, we focus on the direct effects of each of the antecedent variables on reading and mathematics achievement. (We delay any discussion of the direct effects of number of parents on achievement until we report on the decomposition of the total effects of these variables on reading and mathematics achievement into direct and indirect effects.) Finally, we decompose the total effects of number of parents and maternal work on student's achievement. For number of parents, we decompose effects within levels of race, and for maternal work, we examine the effects within each of the four samples defined by number of parents and race.

Direct Effects. In Table 2, parameter estimates of direct effects of exogenous and endogenous variables on endogenous and outcome variables for each of the four models are presented.

TABLE TWO ABOUT HERE

Beginning with the first two equations which relate maternal work status to mother's educational attainment, we observe that there is a positive and significant effect on working full-time and a negative effect on working part-time in the single-black sample. Number of siblings is consistently and negatively related to mother's educational attainment. In the dual-white sample, working either full-time or part-time also has significant and negative direct effects on number of siblings. For the family income equation, we observe that mother's educational attainment is positively related to family income in each of the samples. In addition, working full-time and part-time has a significant and positive effect in the single-white sample.

Mother's college aspirations for students is consistently and positively influenced across the four samples by mother's educational attainment. In addition, working full-time has a positive effect on aspirations in the single-black sample and student's gender (girls coded as 1) is positively related to aspirations in the dual-white sample. The presence of 50 or more books in a student's home is positively related to mother's education attainment; number of siblings, and mother's college

aspirations for a student also have positive effects in the dual white sample.

As observed by Milne et al., (1983), time spent watching television by a student tends not to be influenced consistently by the antecedent variables in the model. The primary exception to this is the significant and negative direct effect of mother's educational attainment in the dual- and single-white samples. On the other hand, time spent doing homework, and time spent reading are affected to some extent by the antecedent variables, particularly mothers' college aspirations for their children. For the white dual-parent sample, time spent doing homework is positively affected by mother's educational attainment, gender (girls spend more time on homework), and by mother's college aspirations for the students. Homework is affected negatively by the mother's working full-time and less than full-time over the child's lifespan. The effects on homework are duplicated for the white single-parent sample with respect to mother's educational attainment, student's gender, and mother's college aspirations for the student. In the dual-black sample, we find a negative effect of working less than full-time on time spent doing homework.

Time spent reading is positively related to gender (girls read more) and mother's educational attainment in the two white samples. In the dual-parent, white sample,

reading is also positively affected by mother's college aspirations for a student and negatively affected by full-time maternal working.

In the reading achievement equation, we find that mother's educational attainment, number of books, and time spent reading have positive and significant direct effects on reading achievement in the dual-white and single-white samples. In addition, time spent on homework, and mother's college aspirations for a student have significant and positive effects on reading achievement in the sample of students from dual-white homes. Time spent watching television, number of siblings, and mother's working have significant and negative effects on reading achievement in the dual-white sample. An examination of the single-white and black samples shows that only time spent on homework tends to have a somewhat consistent effect. For both the dual-black and single-black samples, the estimate of the direct effect of time spent on homework on reading achievement is positive and significant. In addition, in only the single-white and single-black samples does family income have a significant direct effect on reading achievement.

The final set of direct effects we examine pertains to the mathematics achievement equations. We again observe that mother's educational attainment tends to have positive and significant direct effects. For the students

from dual-white households, we observe that mathematics achievement is directly and positively influenced by not only mother's educational attainment, but by mother's college aspirations for a student, time spent on homework and reading. On the other hand, mother's working some time, but not always full-time over the child's lifespan, students' gender (being a girl), and time spent watching television have negative direct effects on mathematics achievement for the white, dual-parent sample. In addition to mother's education, only students' gender, number of siblings, family income, time spent on homework and reading, and mother's college aspirations have occasional significant direct effects in samples other than the dual-white.

The estimates we have obtained for the achievement-gender, achievement-homework, and achievement-television relationships are contrary to those found by Milne et al., (1983). First, Milne et al., (1983) found that the direct effect of gender on both reading and mathematics achievement tended to be positive; that is, girls tended to score higher than boys on reading and mathematics achievement tests, all other things being equal. By high school, we find that male students tend to score higher than females in mathematics. Analyses not shown here indicate that the total effect of gender on mathematics achievement is also negative. In other words, the sum of

the direct and indirect effects of being female on mathematics achievement has, on the average, a negative effect. In analyses not reported by Milne et al., (1983), the total effect of being female tends to be positive on both reading and mathematics achievement.

Second, as noted previously in our review of the literature, Milne et al., (1983) found no relationship between time spent watching television and student's achievement. In this study, however, we observed a negative relationship in the sample of students from dual-white households. Further, we observed a positive relationship between time spent on homework and achievement while Milne et al., (1983) found a negative relationship. The contradiction between our finding and those by Milne et al., (1983) for the television-achievement relationship supports previous research which suggests that the effects of television viewing may not be apparent until students reach high school (Hornik, 1978). A possible explanation for the difference in homework-achievement effects may be that by high school, the degree of difficulty in the curriculum may have sufficiently increased since elementary school to necessitate a greater amount of time spent on homework if a student is to be a high achiever.

Decomposition of total effects of number of parents and maternal work on students' achievement. In Table 3, total, direct, and indirect effects of number of parents on reading and mathematics achievement for white and black students are presented.

TABLE THREE ABOUT HERE

Procedures for the computation of these effects are briefly described in Milne et al., (1983) and Myers and Rosenthal (1983). The total effects of number of parents on reading and mathematics achievement for white students are 1.32 and .91, respectively; only the total effect on reading achievement is significant. This finding indicates that white students from two-parent homes tend to score between .13 and .09 standard deviation units higher on the reading achievement and mathematics achievement tests than those from single-parent homes. Decomposing these total effects, direct effects of .86 and -.02 and small indirect effects are obtained for the reading and mathematics achievement equations, none of which are substantively significant. For the black sample, similar results are obtained; however, neither total effect is statistically significant.

As already noted, Milne et al., (1983) observed large and statistically significant total effects for number of parents in reading and mathematics achievement for both

white and black students. In addition, they observed that much of the total effect on students achievement was mediated by family income, leaving non-significant direct effects. Here we find that in one instance, number of parents has a significant effect and that no one intervening variable mediates the total effect.

With respect to maternal work status, we observe here that there are significant and negative total effects for maternal work on student's achievement in the dual-white sample: -2.64 and -1.47 for reading and mathematics achievement, respectively. These results fit with those obtained for elementary school age children by Milne et al., (1983). For single-whites, we find insignificant and negative total effects of work status on achievement and in the dual-black sample, negative and generally insignificant total effects are estimated; however, in each of the four equations, negative estimates are obtained. Similarly, for elementary school age students from single-white and dual-black homes, Milne et al., (1983) found insignificant total effects of maternal work on achievement. While the total effects of maternal work on achievement for secondary school age students tend to be insignificant, they are all negative in sign. Finally, for the single-black sample, we find insignificant and positive total effects. These last estimates coincide in sign with those obtained by Milne et al., (1983); however, their estimates were statistically significant.

While our results for secondary school age students confirm to some extent, those obtained for elementary school age students, it must be kept in mind that our measures of work status incorporate information on whether a mother worked before a student was enrolled in elementary school, and while a student was enrolled in elementary school and high school and that the measure used by Milne et al., (1983) refers to the average number of hours worked by a mother during a year while a student was enrolled in elementary school. Thus, some discrepancies may be a function of alternative measures being employed in the two studies.

The magnitude of the effects estimated here indicates that white students from dual-parent homes whose mothers worked full-time over the child's lifespan score about a quarter of a standard deviation below those whose mothers reported never working. This finding holds for both reading and mathematics achievement. White dual-parent students with mothers who worked less than full-time but did work, scored on the average about .14 standard deviations below those with a mother who did not work at all. In addition, we observe that black students from dual-parent households with a mother who worked less than full-time tend to score on the average, about .62 standard deviations below those with a mother who does not work.

Decomposing the total effects into direct and indirect effects shows that in the dual-white sample there are significant and direct negative effects in three out of four equations. The only exception is the mathematics equation for dual-whites with mothers who worked full-time. We also observe a significant and negative direct effect of working full-time in the mathematics equation for single-whites. Examination of the indirect effects shows that in general, no one intervening variable stands out as mediating a substantively significant fraction of the total effect of maternal work. However, family income appears to mediate some of the effect of working full or part-time on achievement for the single-headed households.

Summary and Conclusions

In general, the results of this study replicate the findings of Milne et al., (1983) in one important dimension -- the effect on achievement of maternal work status -- but only partly so in the other -- the effect of single parents. There are also other differences between the studies in the effects of other variables on achievement, particularly the time spent by children doing homework and watching television and gender.

Precise delineation of the reasons for the differences between the results of the two studies is not possible. They may relate to actual differences in the true effects of the independent variables on achievement in high school versus elementary school children. Alternatively, differences may relate to differences in variables used, to different measurement where the same variables are used, to restricted variability in the high school sample, or even to the smaller size of the high school subsamples.

However, to the extent that differences -- or similarities -- may be real, we can suggest possible explanations. With respect to the generally weak effect of father-absence on high school students, compared with the significant effect on elementary school students, it is possible that students of this age are less directly affected by their parents' marital dissolution, given the availability of other support systems outside the home (peers, jobs, even school). This possibility is raised by Hetherington et al., (1981). We unfortunately do not know the onset or duration of the parental loss in either study; however, if it has been relatively recent for the high school students (and remarriage statistics would suggest this to be case), it may have occurred at an age when the child could cope with it realistically and not suffer from guilt and depression as do younger children (Hetherington et al., 1981). Alternatively, if the

single-parent situation has been of longer duration (more likely with older than with younger children), the students may have had time to integrate the loss. Clearly, as noted by a number of authors (Hetherington et al., 1981; Shinn, 1978; Herzog and Sudia, 1973), more research is needed on the timing and duration of marital dissolution and the effects on children's school-related achievement.

With respect to maternal working, the two studies are generally consistent. Both show significant negative total effects of maternal employment for children from dual-parent white families, and in both cases, this effect is primarily direct and unmediated by the variables included in the model. For black children from single-parent homes, on the other hand, maternal working has positive effects on children's achievement, although they are significant only in the study of elementary school students. This latter finding records well with other literature (Heyns, 1982b; Hoffman, 1980), and the reasons offered for it. Basically, it appears that the loss of maternal time at home with the children is offset in poor black families by the relatively more important marginal contribution of maternal employment to family income. At higher income levels, the mother's financial contribution may be worth relatively less, and her time contributions to children's cognitive development worth relatively more (see Goldberg, 1977).

With the high school students studied here, we have used a measure of maternal work status that separates part-time from full-time or no employment, over the child's lifespan. This adds a dimension to the finding reported by Coleman et al., (1982), who used only the student data. In that study, Coleman included separate measures for maternal working before elementary school and for maternal working during elementary school (omitting the measure of working during high school). He found only the earliest time point to be significantly and negatively related to high school achievement.

A final comment is in order on the consistent negative effects of maternal employment for dual-parent white students in both high school and elementary school. In both cases, the direct, unmediated effects are sizeable. This points up the fact that in neither study, have we been entirely successful in determining how maternal working affects achievement; that is, we have been unable to identify strong intervening variables. The literature (e.g., Leibowitz, 1977; Goldberg, 1977; Clarke-Stewart, 1977; Benson et al., 1980) suggests that variables that measure the content and quality of maternal child interaction should shed light on the connection between maternal time availability and children's achievement. Unfortunately, such measures are usually unavailable in large national surveys.

The study by Milne et al., (1983) and the one reported here also produce different findings with respect to two variables measuring students uses of their own time, particularly time spent doing homework and time spent watching television. For elementary students, time spent doing homework is negatively related to achievement; for high school students, the relationship is positive. It may be that homework time is more productively spent in high school, given the greater specificity and difficulty of the material to be learned. What we observe in elementary students may be a selection factor; the lower achievers spend more time on homework in an effort to raise achievement, but the effort may not be productive.

Television viewing time is negatively related to achievement for high school students, but has no effect on achievement in elementary school. The time spent watching television by high school students may conflict with time needed for homework, while for elementary students there may be no such conflict, or there may be offsetting positive and negative effects.

Finally, the study reported here found that male high school students tend to have higher mathematics achievement scores than female students -- at least in the dual-white sample. On the other hand, Milne et al., (1983) found that girls tended to score higher in both reading and mathematics achievement than boys while in

elementary school. This last discrepancy in findings may suggest that females are less likely than males to take advanced mathematics courses in high school and therefore, perform less well than their male counterparts.

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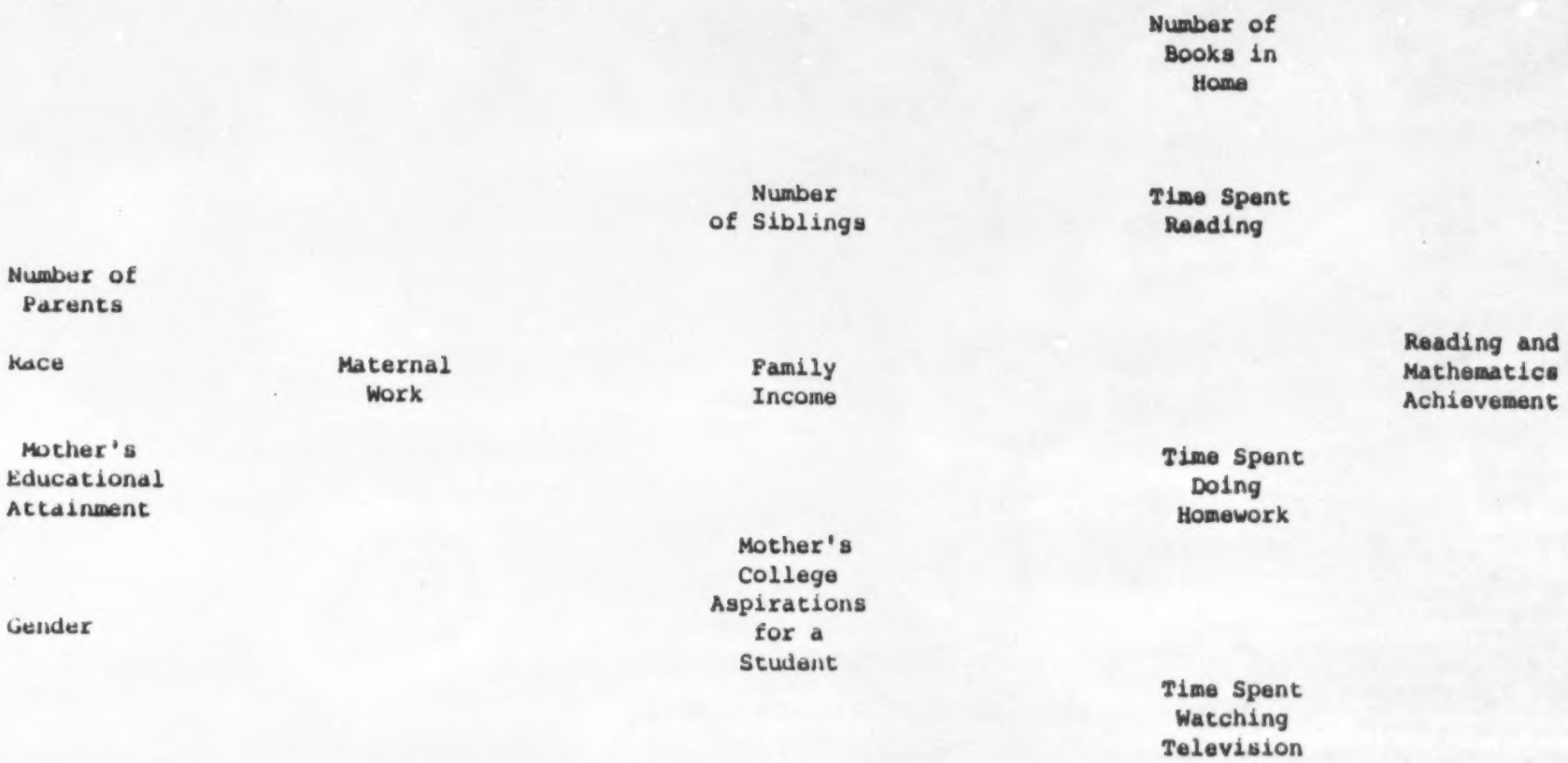
Figure 1 Conceptual Model *



*arrows are deleted from the diagram for simplicity

Table 1

Means of Variables by Race and Number of Parents with Standard Deviations in Parentheses

	Race			
	Black		White	
	Single Parent	Dual Parent	Single Parent	Dual Parent
MED	2.26 (1.11)	2.39 (1.06)	2.70 (1.06)	2.52 (1.00)
FULL-TIME	0.38 (0.49)	0.40 (0.49)	0.23 (0.42)	0.10 (0.30)
PART-TIME	0.59 (0.49)	0.54 (0.50)	0.72 (0.45)	0.67 (0.47)
NO WORK	0.03 (0.16)	0.07 (0.25)	0.05 (0.22)	0.23 (0.42)
NKIDS	4.83 (3.40)	4.61 (2.26)	3.81 (1.98)	3.72 (1.83)
INCOME	11770.10 (10662.80)	28890.20 (21627.40)	17155.40 (14629.80)	38213.40 (23381.70)
BOOKS	0.71 (0.45)	0.83 (0.38)	0.85 (0.36)	0.89 (0.31)
TV	3.53 (1.41)	3.87 (1.34)	3.10 (1.60)	3.00 (1.51)
HOMEWORK	3.34 (2.74)	3.79 (2.99)	3.79 (2.91)	3.80 (2.90)
READING	1.46 (1.13)	1.39 (1.13)	1.30 (1.14)	1.28 (1.15)
MCOLASP	0.61 (0.49)	0.73 (0.44)	0.67 (0.47)	0.71 (0.45)
READ	44.32 (8.39)	45.06 (9.24)	51.79 (10.07)	52.64 (9.57)
MATH	42.55 (8.08)	43.80 (9.64)	52.21 (9.14)	52.90 (9.55)
GENDER (female=1) a/	59.5	55.5	59.8	51.30
Sample Size	150	151	365	2,157

a/ Percent of item.

Item Identification

MED	Mother's educational attainment
FULL-TIME	Mother worked full time before student enrolled in elementary school, while student was in elementary school and while student enrolled in high school
PART-TIME	Mother worked only some of the time before student enrolled in elementary school, while student was in elementary school, or while student was enrolled in high school
NO WORK	Mother never worked
NKIDS	Number of siblings
INCOME	Total family income
BOOKS	Number of books available in the home at child's reading level
TV	Average hours per day child spends watching TV
HOMEWORK	Average hours per week child spends doing homework
READING	Weekly frequency of reading
MCOLASP	Parental educational attainment expectations for their child
READ	Standardized reading achievement score
MATH	Standardized math achievement score
RACE	Student's race
GENDER	Student's gender
NUMHEAD	Number of parents in the home

Table 2

Parameter Estimates for Recursive Models by Race and Number of Parents

Dependent Variables	Sample[a/]	Independent Variables: MED	FULL-TIME	PART-TIME	GENDER	NKIDS	LFAMINC	MCOLASP	BOOKS	T.V.	HOMEWORK	READING	INTERCEPT	R^2
FULL-TIME	W-D	-.002											.108	.0001
		(.007)											(.018)	
	W-S	-.001											.233	.0000
		(.021)											(.061)	
	B-D	.062											.248	.0179
		(.038)											(.098)	
	B-S	.075*											.210	.0297
		(.035)											(.089)	
PART-TIME	W-D	.019											.619	.0017
		(.010)											(.027)	
	W-S	.011											.688	.0007
		(.022)											(.065)	
	B-D	-.049											.654	.0107
		(.038)											(.100)	
	B-S	-.074*											.760	.0278
		(.036)											(.090)	
NKIDS	W-D	-.187**	-.486**	-.399**									4.511	.0203
		(.039)	(.147)	(.094)									(.125)	
	W-S	-.455**	-.639	.080									5.105	.0845
		(.094)	(.487)	(.456)									(.498)	
	B-D	-.416*	-1.288	-.679									6.480	.0733
		(.172)	(.757)	(.740)									(.790)	
	B-S	-.630*	.151	.422									5.946	.0468
		(.251)	(1.761)	(1.738)									(1.787)	
LFAMINC	W-D	.172**	-.097	-.044									9.967	.0633
		(.014)	(.054)	(.035)									(.046)	
	W-S	.241**	.820**	.498*									8.225	.1146
		(.045)	(.232)	.217									(.237)	
	B-D	.551**	-.268	-.441									8.786	.1759
		(.102)	(.452)	(.441)									(.472)	
	B-S	.431**	1.003	.708									7.133	.2131
		(.078)	(.551)	(.544)									(.559)	
MCOLASP	W-D	.113**	-.045	-.021	.048*								.416	.0653
		(.009)	(.036)	(.023)	(.019)								(.032)	
	W-S	.101**	-.128	-.161	.070								.503	.0379
		(.023)	(.119)	(.111)	(.050)								(.127)	

Table 2 (continued)

Dependent Variables	Sample[a/]	Independent Variables: MED	FULL-TIME	PART-TIME	GENDER	NKIDS	LFAMINC	MCOLASP	BOOKS	T.V.	HOMEWORK	READING	INTERCEPT	R^2
MCOLASP	B-D	.104**	.004	-.191	.128								.515	.1216
		(.033)	(.145)	(.141)	(.071)								(.159)	
	B-S	.070*	.612*	.451	-.024								-.032	.0908
		(.035)	(.250)	(.246)	(.079)								(.263)	
BOOKS	W-D	.050**	-.046	-.020	.016	.009**	.011	.070**					.576	.0518
		(.007)	(.024)	(.016)	(.013)	(.004)	(.010)	(.015)					(.101)	
	W-S	.079**	-.045	-.041	-.064	-.005	.019	.045					.522	.0916
		(.019)	(.091)	(.084)	(.038)	(.010)	(.021)	(.041)					(.198)	
	B-D	.083**	.032	-.005	.075	-.009	.013	.142					.393	.1365
		(.032)	(.126)	(.123)	(.062)	(.014)	(.023)	(.072)					(.271)	
	B-S	.097**	-.309	-.353	.078	-.012	-.002	.125					.770	.1291
		(.036)	(.237)	(.231)	(.074)	(.011)	(.035)	(.077)					(.369)	
T.V.	W-D	-.189**	.271*	-.081	-.109	.016	-.009	-.168*					3.708	.0297
		(.034)	(.121)	(.078)	(.065)	(.018)	(.048)	(.074)					(.504)	
	W-S	-.195*	-.047	-.220	.082	-.056	-.127	-.009					5.155	.0317
		(.087)	(.423)	(.392)	(.176)	(.045)	(.098)	(.189)					(.919)	
	B-D	-.019	.361	-.073	-.043	.016	-.181*	.029					5.505	.0588
		(.118)	(.463)	(.453)	(.227)	(.051)	(.085)	(.265)					(.999)	
	B-S	.044	.206	-.309	-.083	-.012	.096	.364					2.564	.0829
		(.116)	(.756)	(.735)	(.236)	(.035)	(.112)	(.245)					(1.176)	
HOMEWORK	W-D	.421**	-.618**	-.330*	.819**	-.041	.137	1.030**					.603	.0930
		(.063)	(.225)	(.145)	(.120)	(.033)	(.090)	(.136)					(.934)	
	W-S	.448**	.604	.560	.666*	.065	-.113	1.244**					1.633	.0820
		(.155)	(.751)	(.696)	(.314)	(.080)	(.174)	(.335)					(1.633)	
	B-D	.470	-1.926	-2.079*	-.241	-.120	-.008	1.234*					4.413	.1270
		(.253)	(.995)	(.973)	(.488)	(.109)	(.183)	(.569)					(2.147)	
	B-S	-.306	.403	.762	.820	.097	.430	.994*					-1.974	.0856
		(.225)	(1.467)	(1.428)	(.458)	(.067)	(.217)	(.475)					2.284	
READING	W-D	.093**	-.345**	-.091	.287**	-.012	-.004	.165**					.973	.0373
		(.026)	(.092)	(.059)	(.050)	(.014)	(.037)	(.056)					(.382)	
	W-S	.148*	-.163	-.076	.321**	-.017	-.011	.208					.832	.0490
		(.061)	(.297)	(.275)	(.124)	(.032)	(.069)	(.133)					(.645)	
	B-D	-.002	.042	.019	.221	.045	-.026	.059					1.249	.0221
		(.101)	(.398)	(.390)	(.195)	(.043)	(.073)	(.228)					.860	
	B-S	-.163	-.160	.193	.323	-.006	.136	.409*					.149	.0817
		(.093)	(.606)	(.589)	(.189)	(.028)	(.090)	(.196)					(.943)	

Table 2 (continued)

Dependent Variables	Sample[a/]	Independent Variables: MED	FULL-TIME	PART-TIME	GENDER	NKIDS	LFAMINC	MCOLASP	BOOKS	T.V.	HOMEWORK	READING	INTERCEPT	R^2
READ	W-D	.860**	-1.562*	-1.144*	-.301	-.212*	-.335	3.219**	2.064**	-.559**	.206**	1.925**	50.092	.1568
		(.207)	(.720)	(.463)	(.387)	(.106)	(.285)	(.442)	(.640)	(.128)	(.070)	(.171)	(3.038)	
	W-S	1.437**	-3.570	-3.713	-.759	.345	1.606**	1.429	3.535*	-.389	.007	2.443**	29.406	.2211
		(.516)	(2.395)	(2.220)	(1.019)	(.256)	(.556)	(1.092)	(1.422)	(.304)	(.171)	(.439)	(5.498)	
	B-D	.417	-1.951	-3.261	-1.428	.904**	.478	1.738	1.347	.149	.698**	.507	40.575	.2302
		(.772)	(2.983)	(2.913)	(1.449)	(.324)	(.548)	(1.727)	(2.096)	(.552)	(.251)	(.649)	(7.138)	
	B-S	-1.104	-4.695	-4.239	-1.309	.121	1.804**	4.971**	.909	-.266	.642**	1.539**	28.095	.3097
		(.637)	(3.977)	(3.889)	(1.261)	(.183)	(.599)	(1.331)	(1.484)	(.443)	(.230)	(.589)	(6.354)	
MATH	W-D	.844**	-1.393	-1.240**	-2.737**	-.031	.159	4.597**	.658	-.742**	.493**	.883**	46.978	.1729
		(.205)	(.711)	(.457)	(.382)	(.104)	(.282)	(.437)	(.632)	(.126)	(.069)	(.169)	(3.002)	
	W-S	1.240**	-4.944*	-3.812	-2.328**	-.209	1.790**	4.263**	2.021	-.366	.243	1.226**	32.116	.2739
		(.454)	(2.106)	(1.952)	(.896)	(.225)	(.489)	(.960)	(1.251)	(.268)	(.151)	(.386)	(4.835)	
	B-D	2.440**	-2.693	-4.225	-2.288	-.596*	.636	2.217	2.804	1.055*	.681**	.270	28.155	.4009
		(.711)	(2.746)	(2.682)	(1.334)	(.298)	(.505)	(1.589)	(1.930)	(.508)	(.231)	(.597)	(6.571)	
	B-S	.726	-.424	-.381	.218	-.506**	.744	.572	-.394	-.642	.770**	.857	35.356	.1896
		(.665)	(4.149)	(4.058)	(1.315)	(.191)	(.625)	(1.389)	(1.549)	(.462)	(.240)	(.614)	(6.630)	

a/ Samples are: W-D = white dual-headed household; W-S = white single-headed household; B-D = black dual-headed household; B-S = black single-headed household.

* Refers to statistical significance at the .05 level.

** Refers to statistical significance at the .01 level.

Table 3

Total, Direct, and Indirect Effects[a/] of Number of Parents and Maternal Work Status in Student's Achievement

Exogenous Variables	Endogenous Variables	Total Effect	Direct Effect	Indirect Effects Via Intervening Variables								
				FULL-TIME	PART-TIME	#KIDS	LFAMINC	MCOLASP	BOOKS	T.V.	HOMEWORK	READING
Whites												
Number of Parents	READ	1.32*	.86	.34	.06	.05	-.27	.21	.07	.05	-.02	-.01
	MATH	.91	-.02	.32	.07	.01	.23	.28	.02	.06	-.05	.00
Dual-Whites												
FULL-TIME	READ	-2.64**	-1.56*	- -	.00	.13	.03	-.17	-.09	-.15	-.13	-.66
	MATH	-2.47**	-1.39	- -	.00	.03	-.02	-.24	-.03	-.20	-.30	-.30
PART-TIME	READ	-1.36**	-1.14*	.00	- -	.09	.01	-.08	-.04	.05	-.07	-.18
	MATH	-1.53**	-1.24**	.00	- -	.03	-.01	-.11	-.01	.06	-.16	-.08
Single-Whites												
FULL-TIME	READ	-3.18	-3.57	- -	.00	-.19	1.39	-.27	-.16	-.02	.00	-.40
	MATH	-4.06	-4.94*	- -	.00	.13	1.51	-.63	-.09	.02	.15	-.20
PART-TIME	READ	-3.43	-3.71	.00	- -	.02	.84	-.34	-.15	.09	.00	-.18
	MATH	-3.67	-3.81	.00	- -	-.02	.91	-.79	-.08	.08	.14	-.09
Blacks												
Number of Parents	READ	.59	-.72	-.01	.23	.17	.34	.28	.11	.07	.14	-.01
	MATH	.86	-1.09	-.02	.30	.12	.36	.35	.22	.50	.13	-.00
Dual-Blacks												
FULL-TIME	READ	-2.03	-1.95	- -	.00	1.26	-.12	.01	.04	.05	-1.34	.02
	MATH	-2.76	-2.69	- -	.00	.87	-.13	.01	.09	.38	-1.31	.01
PART-TIME	READ	-4.78	-3.26	.00	- -	.66	-.20	-.54	-.01	-.01	-1.45	.01
	MATH	-6.15*	-4.23	.00	- -	.46	-.21	-.67	-.01	-.08	-1.42	.00
Single-Blacks												
FULL-TIME	READ	1.13	-4.70	- -	.00	.02	2.27	3.83	-.28	-.05	.26	-.25
	MATH	1.67	-.42	- -	.00	-.06	1.13	.86	.12	-.13	.31	-.14
PART-TIME	READ	.82	-4.24	.00	- -	.07	1.60	2.82	-.32	.08	.49	.30
	MATH	1.97	-.38	.00	- -	-.18	.80	.63	.14	.20	.59	.17

a/ Tests of statistical significance for the indirect effects were not computed.

* Indicates statistical significance of the .05 level.

** Indicates statistical significance at the .01 level.

APPENDIX A

Variables and Means

Variable	Coding	Mean	Standard Deviation
RACE	Race; coded as black = 1, white = 0	10.7% black 89.3% white	
NUMHEAD	Number of parents in household; coded as dual parent (both mother and father present) = 1, single parent (only mother present) = 0	18.2% single parents 81.8% dual parents	
FULL-TIME	Mother worked full-time before student enrolled in elementary school, while student was in elementary school, and while student enrolled in high school; coded as true = 1, false = 0	0.15	0.35
PART-TIME	Mother worked only some of the time (either full-time or part-time) before student enrolled in elementary school, while student was in elementary school, or while student was enrolled in high school; coded as true = 1, false = 0	0.19	0.39
NOWORK	Mother never worked; coded as true = 1, false = 0	0.66	0.47
MED	Mother's educational attainment; coded as less than high school = 1, high school graduate = 2, less than a year of vocational trade = 3, 1-2 years of vocational	2.52	1.02

Appendix A (continued)

Variable	Coding	Mean	Standard Deviation
MED (continued)			
	trade = 3, 2 years of vocational trade = 3, some college = 3, 2 year college program = 3, 4-5 year college program = 4, master's degree = 5, Ph.D = 6		
GENDER	Student's gender; coded as females = 1, males = 0	53.0% female 47.0% males	
LFAMINC	Log (natural) of family income	10.14	0.92
NKIDS	Number of siblings	3.84	2.00
MCOLASP	Parent educational expectations for their child; coded as plans for student to attend college = 1, does not plan for student to attend college = 0	0.70	0.46
BOOKS	Number of books available in the home at the child's reading level; coded as 50 or more books = 1, less than 50 books = 0	0.88	0.33
READING	Weekly frequency of reading (ordinal scale: range is from 0 to 3	1.31	1.15
HOMEWORK	Average hours per week child spends doing homework; (range is from 0 to 10 hours)	3.78	2.90
TV	Average hours per day child spends watching TV (range is 0 to 5 hours)	3.08	1.53

Appendix A (continued)

Variable	Coding	Mean	Standard Deviation
READ[a]/	Reading achievement score; standardized to mean = 50, standard deviation = 10	51.74	9.85
MATH[a]/	Math achievement score standardized to mean = 50, standard deviation = 10	51.84	9.87

a/ Mean does not equal 50 and standard deviation not equal to 10 because of missing data.